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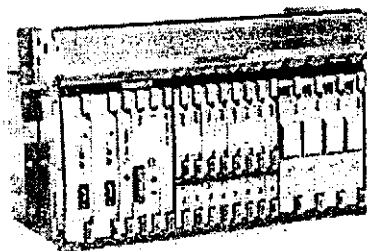
Case Study- Carrier Services

Case Study (Corporate Headquarters)

Multiplexers

Fujitsu Multiplexers Specification

FLM 600 ADM
For OC-12 based networks. Supports DS3, EC-1 and OC-3 tributaries with full STS-1 and STS-3-level grooming and bandwidth management.

Description
Industry-Leading OC-12 Multiplexer
The high-quality, proven FLM 600 ADM for the 5X2 OC-12 customer premises and interoffice network requirements. With its inherent flexibility, FLM 600 ADM lets you construct a multitude of network configurations, all from a single shelf and set of plug-in cards. With the ability to upgrade in-service to the FLM 2400 ADM, network can grow cost effectively to OC-48 rates and beyond.

FLM 600 ADM saves costs by giving you the ability to use it in various configurations and change to another configuration while in service. With the FLM 600 ADM, you get:

•Survivable SONET architectures:
- Terminal
- Unidirectional path-switched ring (UPSR)
- Linear add/drop
- Optical hub

- In-service upgrades from one architecture to another

•Variety of tributary interfaces:
- DS3 interfaces
- EC-1 and OC-3 interfaces

FLM 600 ADM supports all configurations from a single shelf and set of plug-in cards, which saves time and money when network needs upgrading. A simple software provisioning command allows in-service configuration changes from terminal to UPSR or linear ADM operation.

Step up to OC-48 Capacity

Handling network capacity increases is a snap with the FLM 600 ADM. When ready to upgrade all or part of your network to OC-48, just install OC-48-based FLM 2400 ADM and reassign your existing FLM 600 ADMs as tributary shelves for the FLM 2400 ADM. You retain your existing FLM 600 ADMs as you grow.

Route Traffic Any Way You Want It
A key strength of the FLM 600 ADM is its bandwidth management. You can assign any STS-1 or STS-3 from your line network connections to any low-speed port. FLM 600 ADM's advanced bandwidth management gives you support for many types of connections that will simplify your network, such as:

•Full STS-1 level grooming and bandwidth management
•One-way and two-way connections
•Drop and continue for dual-node ring interconnection
•Broadcast

Combine Multiple Products for the Best Solution
FLM 600 ADM interconnects smoothly with other FLM products to give the best network flexibility. You can mix and match different products in the same network. For example, you can combine FLM 150 ADM, FLM 600 ADM, and FACTR® on the same OC-12 ring. Plus, SONET DCC interconnection means you get full network management support across your entire Fujitsu network.

Specification

Advanced Features
•Full STS-1 bandwidth management and grooming
•Drop and continue for secure dual-node ring interconnection
•Full PDI/PLM support
•SONET/SDH support on OC-3 optics
•Auto facility detection and auto equipment configuration
•In-service architecture and capacity upgrades

Architectures
•Terminal
•Unidirectional path-switched ring (UPSR)

Protection Ratio
DS3, EC-1 1:1
Optical 1+1

Operations Support
•TL1 protocol over X.25, OSI/X.25, OSI/LCN, or IP/LCN
•Software download and remote memory backup
•Supported by FLEXR® Plus and NETSMART™ network management systems
•Supported by FLEXR® and FLEXR® GT craft user interfaces
•OSMINE compliant

•Linear add/drop
•Optical hub

Capacity
12 STS-1s in flexible combinations

Interfaces
Line OC-12
Tributary DS3, EC-1, OC-3/3c

Tributary Interface Maximum Quantities
DS3, EC-1 12
OC-3/3c 4

Time Slot Assignment
12 x STS-1
4 x STS-3

Optics
1310 nm and 1550 nm optical units
FC, SC, ST, D4 connectors

Synchronization
•Synchronization status messaging
•DS1 BITS primary and secondary clock output/input

Power Consumption
Maximum 142 W
Typical (12 DS3 ring) 117 W

Operating Environment
Temperature: -40°C to 65°C (-40°F to 149°F)
—Humidity: 5% to 95% (Non-condensing)
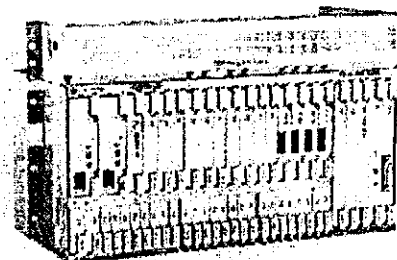Convection cooling for all applications

Physical Characteristics
Dimensions: 10.5"H x 23"W x 12"D
Weight: 38 kg (83 lb)
NEBS compliant

The FLM 150 ADM is the industry leading OC-3 and OC-12 SONET Multiplexer in North America. It supports DS1, DS3, OC-3, Ethernet, and ATM-based DS3 tributaries and provides you extensive bandwidth management for true any-port-to-any-port connectivity.

Description

Local exchange carriers, competitive carriers, and independent telcos have overwhelmingly chosen FLM 150 ADM to provide proven, cost-effective solutions for their OC-3 and OC-12 transport requirements.

Expandable
FLM150 ADM's flexibility starts with its array of network and tributary support:

•Survivable SONET architectures:
- Terminal
- Unidirectional path-switched ring (UPSR)
- Linear add/drop
- Optical hub
- In-service upgrades from one architecture to another

•Variety of tributary interfaces:
- DS1 and DS3 interfaces
- EC-1 and OC-3 interfaces
- Ethernet™ LAN interface
- DS3 UNI ATM interface
- Extensive VT1.5 and STS-1 time slot assignment control

Direct Ethernet and cell relay support lets you provide transparent LAN service. Each FASTLANE™ -based LAN port can connect across your SONET network to another LAN or cell relay port at any FLM 150 ADM or FACTR® node. Likewise, you can interconnect any cell relay port to another cell relay port on your network. This lets you expand your service offerings and lessen your customers' costs.

With the FLM 150 ADM's transmux card, you gain all the advantages of an integrated M13 multiplexer. For DS1 access or loop networks, you can now hand off DS3 signals at carrier points of presence without having to install external legacy M13 boxes.

FLM150 ADM supports all configurations from a single shelf and set of plug-in cards, which saves time and money when your network needs upgrading. A simple software provisioning command allows in-service configuration changes from terminal to UPSR or linear ADM operation. By replacing OC-3 optics with OC-12optics, the FLM150 ADM allows connection to higher-capacity OC-12 rings with direct DS1 interfaces. All this saves equipment and installation costs as your network changes and grows.

Route Traffic Any Way You Want It

A key strength of the FLM 150 ADM is its bandwidth management:
•Any-port-to-any-port TSA
•Full STS-1 grooming
•Full VT1.5 grooming to DS1, EC-1, and OC-3 tributaries

This allows many types of connections that will simplify your network:
•Drop and continue
•Broadcast
•Hairpinning
•One-way and two-way connections

Combine Multiple Products for the Best Solution

FLM 150 ADM interconnects smoothly with our other products to give you the greatest network flexibility. You can mix and match different products in the same network. For example, you can combine FLM 150 ADM, FLM 600 ADM, and FACTR on the same OC-12 ring. Plus, SONET DCC interconnection means you get full network management support across your entire Fujitsu network.

Specifications

Advanced Features

•OC-3, OC-12, and EC-1 line interfaces
•Tributary hairpinning at both VT1.5 and STS-1 levels
•Transmux for internal M13 multiplexing
•FASTLANE data interfaces
•Full PDI/PLM support
•Auto facility detection and auto equipment configuration
•Any-port-to-any-port TSA
•In-service architecture and capacity upgrades

Architectures

•Terminal
•Unidirectional path-switched ring (UPSR)
•Linear add/drop
•Optical hub

Capacity

Three STS-1s available for add/drop with EC-1, OC-3, or OC-12 line connections

SONET Network Interfaces

Line EC-1, OC-3, OC-12* (*UPSR only)

Tributary Interface Maximum Quantities

DS1 - 84
DS3, EC-1 - 3
OC-3/3c - 2
Ethernet (10Base-T, 10Base-FL) - 8
Ethernet (100Base-T) - 2

TSA/TSI Switch Capacities

•84 x 84 VT1.5
•3 x 3 STS-1
•12 x 12 STS-1 for OC-12 UPSR
•VT path switching and grooming into any EC-1 or OC-3 tributary
•Combinations of the above

Operations Support

•TL1 protocol over X.25, OSI/X.25, OSI/LCN, or IP/LCN
•Software download and remote memory backup
•Supported by FLEXR® Plus and NETSMART™ network management systems
•Supported by FLEXR® and FLEXR® GT craft user interfaces
•OSMINE compliant

Synchronization

•DS1 BITS primary and secondary clock output/input
•*Line timing derived from OC-3/OC-12 signal*
•Line timing derived from OC-3 or EC-1 tributary
•Internal clock
•Synchronization status messaging

Power Consumption

Maximum 142 W
Typical (28 DS1 ring) 82 W

Operating Environment

Temperature: -40°C to 65°C (-40°F to 149°F)
Humidity: 5% to 95% (Non-condensing)
Convection cooling for all applications

Fujitsu Multiplexers Specification

DS3 UNI - 4

Protection Ratio

DS1 - 1:7
DS3, EC-1 - 1:1
Optical - 1+1

Optics

1310 nm and 1550 nm optical units
FC, SC, and ST connectors

Physical Characteristics

Dimensions: 10.5"H x 12"D for 23" racks
Weight: 38 kg (83 lb)
NEBS compliant

Specifications subject to change without notice.

2/2/2006

http://ciptechnology.com/converge_case_study/case_fujitsu_multiplexers_specificati.htm